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10/764,747	01/26/2004	Cheng Kuo Tsung	MXIC-P910327	8731

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EXAMINER	
WEST, JEFFREY R	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/764,747	TSUNG ET AL.	
	Examiner	Art Unit	
	Jeffrey R. West	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Response to Amendment

2. In light of reconsideration of Applicant's response filed March 07, 2006, prosecution is hereby re-opened and a new ground of rejection is provided below.

Oath/Declaration

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not identify the mailing address of each inventor. A mailing address is an address at which an inventor customarily receives his or her mail and may be either a home or business address. The mailing address should include the ZIP Code designation. The mailing address may be provided in an application data sheet or a supplemental oath or declaration. See 37 CFR 1.63(c) and 37 CFR 1.76.

The clause regarding "willful false statements ..." required by 37 CFR 1.68 has been omitted.

It does not identify the citizenship of each inventor.

Specification

4. The disclosure is objected to because of the following informalities:

On page 5, paragraphs 0024 and 0028 describe Figures 11 and 15, respectively, as screenshots while Figures 11 and 15 appear to present a "process flow". A similar problem exists on page 14, paragraph 0063, line 3 and page 15, paragraph 0067, line 1.

On page 9, paragraph 0049, line 22, "(column (d)" should be ---(column d)---.

Appropriate correction is required.

5. The specification is further objected to for the following issues:

The general method for estimating a maintenance date is described on pages 8-9, paragraph 0049, lines 1-9, specifically:

> When the difference is less than or equal to the predefined value, a maintenance procedure (S106) needs to proceed, for example, at once. For example, if the predefined value is zero, then the tool needs to be maintained once the detected value of the parameter reaches the maintenance value. If the difference is greater than the predetermined value, a maintenance date calculation (S104) is performed, wherein the maintenance date is estimated by dividing the difference by a variety or variation value and adding this result to the current date. Since in the illustrated embodiment the difference is being divided by the variation value, the variation value represents change of the parameter per time unit.

The specification also defines the "Variation" value to be determined as [Σ(Current value $_{(n)}$ – Current Value $_{(n-1)}$)]/ (Date $_{(1)}$ – Date $_{(7)}$) defines the "Forecast Day" as Date + [(Min value of parameter – Current Value) / Variation] and defines the Current Value $_{(n)}$ as Parameter Value $_{(n)}$– Parameter Value $_{(lastPM)}$.

The Examiner first notes that the notation used by Applicant is confusing as the "Date" is provided in the format YYYY/M/D, however, when used for the sake of calculations, only the day is considered. It is further unclear as to what the "1" and "7" refer to in the factor (Date $_{(1)}$ – Date $_{(7)}$). It is assumed, however, that the "Date $_{(1)}$" refers to the first date considered corresponding to the last PM and each day is counted up to the seventh day past this last PM, i.e. Date $_{(7)}$.

The Examiner then notes that in the Example1 described on page 8, the "Variation" value for "Date" 2003/4/4 is 150. Using the formula given above, (i.e. [Σ(Current value $_{(n)}$ – Current Value $_{(n-1)}$)] / (Date $_{(1)}$ – Date $_{(7)}$)), using the "day" in place of the "date", and substituting the values for the "Current Value $_{(n)}$", "Current Value $_{(n-1)}$", 1 for Date $_{(1)}$ and 7 for Date $_{(7)}$, the Maintenance Date is calculated accordingly:

[Σ(Current value $_{(n)}$ – Current Value $_{(n-1)}$)]/ (Date $_{(1)}$ – Date $_{(7)}$)),

[((450-300) + (300-100) + (100-0))] / (1 – 7)),

[450] / -6

-75

This is not consistent with the result given by Applicant that indicates that the resulting variation value is 150.

The second issue with respect to the instant disclosure is with reference to the calculation of the Forecast Day.

As noted above, the disclosed formula for calculating the variation value is not consistent with the results provided by Applicant. However, using the variation values provided by Applicant a second problem arises with respect to the date "2003/4/5".

Using the formula given above for the Forecast Day (i.e. Date + [(Min value of parameter – Current Value) / Variation]) and again using the "day" in place of the "date" and substituting the values of 5 for the "Date", 900 for the "Min value of parameter", 550 for "Current Value", and 137.5 for the "Variation":

Date + [(Min value of parameter – Current Value) / Variation]

5 + [(900 – 550) / 137.5]

5 + [2.55]

7.5455

This is not consistent with the result given by Applicant that indicates that the resulting value is 7. While Applicant appears to be turning the numerical value back into a corresponding date, it seems that a "day" value of 7.5455 would be rounded-up to 8, rather than down to 7. However, Applicant provides no explanation that rounding is performed, nor the reason for rounding down.

Further, with respect to "Date" 2003/4/8 the following is calculated:

Date + [(Min value of parameter – Current Value) / Variation]

8 + [(900 – 1050) / 150]

8 + [-1]

7

This is not consistent with the result given by Applicant that indicates that the resulting value is 8.

The third issue with respect to the instant disclosure is with reference to the use of the calculated Forecast Day.

Turning again to the Example1 described on page 8, several Forecast PM dates have been calculated as follows:

Date	Forecast Day
2003/4/2	2003/4/10
2003/4/3	2003/4/7
2003/4/4	2003/4/7
2003/4/5	2003/4/7
2003/4/6	2003/4/7
2003/4/7	2003/4/7
2003/4/8	2003/4/8

The table provided indicates that two dates calculate forecast days as the 10^{th} and 8^{th}, with the remaining forecast days being calculated to be the 7^{th}. However, as

shown in the Example1, the actual Maintenance Day is used as 2003/4/9. It is unclear to one having ordinary skill in the art as to why the 9th is selected as the Maintenance Day, when the forecasted Maintenance Day is given as a plurality of different Maintenance Days with a mode of 7.

The Date 2003/4/8 is also indicated as "the forecast day", however, this determination is indicated to be made because "Current value < Max value" with no bearing on the actual calculated forecasted Maintenance Day.

Further, since all of the Current Values listed are less than the Maximum value, it is unclear to one having ordinary skill in the art as to what distinguishes the 8th from any other date.

The Examiner also notes that Applicant is using the term "Date" but only referring to the "day" for use in performing calculations. It is unclear to one having ordinary skill in the art, however, as to the manner for adding [(Min value of parameter – Current Value) / Variation] to the current day, if the current day is at the end of the month. For example, if the current day is March 31st, and the Forecast day formula results in "Date + 4", the resulting Forecast Day would be 35. It is unclear whether any provision is made to accommodate such a value.

Claim Objections

6. Claims 12 and 20 are objected to because of the following informalities:

In claim 12, line 4, to avoid problems of antecedent basis, "the parameters" should be ---the plurality of parameters---.

In claim 20, line 6, to avoid problems of antecedent basis, "to a variation value" should be ---to the variation value---.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Independent claim 1 recites, "estimating a maintenance date according to the difference and a variation value if the difference is greater than the predefined value, the variation value representing a change in the parameter per unit time and the maintenance date being estimated by adding (a) a current date to (b) the difference divided by the variation value."

This limitation, however, is not sufficiently described in the instant disclosure to enable one having ordinary skill in the art to make and/or use the invention.

The general method for estimating a maintenance date is described on pages 8-9, paragraph 0049, lines 1-9, specifically:

> When the difference is less than or equal to the predefined value, a maintenance procedure (S106) needs to proceed, for example, at once. For example, if the predefined value is zero, then the tool needs to be maintained once the detected value of the parameter reaches the maintenance value. If the difference is greater than the predetermined value, a maintenance date calculation (S104) is performed, wherein the maintenance date is estimated by dividing the difference by a variety or variation value and adding this result to the current date. Since in the illustrated embodiment the difference is being divided by the variation value, the variation value represents change of the parameter per time unit.

The specification also defines the "Variation" value to be determined as $[\Sigma(\text{Current value}_{(n)} - \text{Current Value}_{(n-1)})]/ (\text{Date}_{(1)} - \text{Date}_{(7)})$ defines the "Forecast Day" as Date + [(Min value of parameter – Current Value) / Variation] and defines the $\text{Current Value}_{(n)}$ as $\text{Parameter Value}_{(n)} - \text{Parameter Value}_{(\text{lastPM})}$.

The Examiner first notes that the notation used by Applicant is confusing as the "Date" is provided in the format YYYY/M/D, however, when used for the sake of calculations, only the day is considered. It is further unclear as to what the "1" and "7" refer to in the factor $(\text{Date}_{(1)} - \text{Date}_{(7)})$. It is assumed, however, that the "$\text{Date}_{(1)}$" refers to the first date considered corresponding to the last PM and each day is counted up to the seventh day past this last PM, i.e. $\text{Date}_{(7)}$.

The Examiner then notes that in the Example1 described on page 8, the "Variation" value for "Date" 2003/4/4 is 150. Using the formula given above, (i.e. [Σ(Current value $_{(n)}$ – Current Value $_{(n-1)}$)] / (Date $_{(1)}$ – Date $_{(7)}$)), using the "day" in place of the "date", and substituting the values for the "Current Value $_{(n)}$", "Current Value $_{(n-1)}$", 1 for Date $_{(1)}$ and 7 for Date $_{(7)}$, the Maintenance Date is calculated accordingly:

[Σ(Current value $_{(n)}$ – Current Value $_{(n-1)}$)]/ (Date $_{(1)}$ – Date $_{(7)}$)),

[((450-300) + (300-100) + (100-0))] / (1 – 7)),

[450] / -6

-75

This is not consistent with the result given by Applicant that indicates that the resulting variation value is 150.

Second, the limitation of claim 1 is not sufficiently enabled by the specification with reference to the calculation of the Forecast Day.

As noted above, the disclosed formula for calculating the variation value is not consistent with the results provided by Applicant. However, using the variation values provided by Applicant a second problem arises with respect to the date "2003/4/5".

Using the formula given above for the Forecast Day (i.e. Date + [(Min value of parameter – Current Value) / Variation]) and again using the "day" in place of the

"date" and substituting the values of 5 for the "Date", 900 for the "Min value of parameter", 550 for "Current Value", and 137.5 for the "Variation":

Date + [(Min value of parameter – Current Value) / Variation]

5 + [(900 – 550) / 137.5]

5 + [2.55]

7.5455

This is not consistent with the result given by Applicant that indicates that the resulting value is 7. While Applicant appears to be turning the numerical value back into a corresponding date, it seems that a "day" value of 7.5455 would be rounded-up to 8, rather than down to 7. However, Applicant provides no explanation that rounding is performed, nor the reason for rounding down.

Further, with respect to "Date" 2003/4/8 the following is calculated:

Date + [(Min value of parameter – Current Value) / Variation]

8 + [(900 – 1050) / 150]

8 + [-1]

7

This is not consistent with the result given by Applicant that indicates that the resulting value is 8.

Third, the limitation of claim 1 is not sufficiently enabled by the specification with reference to the use of the calculated Forecast Day.

Turning again to the Example1 described on page 8, several Forecast PM dates have been calculated as follows:

Date	Forecast Day
2003/4/2	2003/4/10
2003/4/3	2003/4/7
2003/4/4	2003/4/7
2003/4/5	2003/4/7
2003/4/6	2003/4/7
2003/4/7	2003/4/7
2003/4/8	2003/4/8

The table provided indicates that two dates calculate forecast days as the 10^{th} and 8^{th}, with the remaining forecast days being calculated to be the 7^{th}. However, as shown in the Example1, the actual Maintenance Day is used as 2003/4/9. It is unclear to one having ordinary skill in the art as to why the 9^{th} is selected as the Maintenance Day, when the forecasted Maintenance Day is given as a plurality of different Maintenance Days with a mode of 7.

The Date 2003/4/8 is also indicated as "the forecast day", however, this determination is indicated to be made because "Current value < Max value" with no bearing on the actual calculated forecasted Maintenance Day.

Further, since all of the Current Values listed are less than the Maximum value, it is unclear to one having ordinary skill in the art as to what distinguishes the 8th from any other date.

The Examiner also notes that Applicant is using the term "Date" but only referring to the "day" for use in performing calculations. It is unclear to one having ordinary skill in the art, however, as to the manner for adding [(Min value of parameter – Current Value) / Variation] to the current day, if the current day is at the end of the month. For example, if the current day is March 31st, and the Forecast day formula results in "Date + 4", the resulting Forecast Day would be 35. It is unclear whether any provision is made to accommodate such a value.

Claim 1 is also rejected under 35 U.S.C. 112, first paragraph, because it recites, "obtaining a difference between a detected value of the parameter and a maintenance value of the parameter; determining whether the difference is less than or equal to a predefined value...estimating a maintenance data according to the difference and a variation value...the maintenance date being estimated by adding (a) a current date to (b) the difference divided by the variation value."

Pages 7-8, paragraph 0048, lines 19-28, recite:

> In the embodiment of FIG. 1, a difference (S100) between a maintenance value of a parameter and a detected value of the parameter is obtained, wherein the detected value of the parameter is taken from a tool. The parameter may be, but is not limited to, number of wafers cycled or a number of RF watt-hours. The

> tool is any piece of equipment that may require maintenance. The difference equals the maintenance value minus the detected value. After the difference is calculated, a comparison (S102) is made to determine whether or not the difference is greater than or equal to a predefined value. Now, in Example 1, the difference (S100) on 2003/4/2 is determined by subtracting 100 from 1100 to yield 1000, which is not less than or equal to zero. Similarly, the difference on 2003/4/3 of 800 is not less than or equal to zero.

Therefore, according to the instant disclosure, the difference is determined by subtracting the "Current Value" from the "Max value of parameter" (i.e. 1100-100=1000 in 2003/4/2 and 1100-300=800 in 2003/4/3).

Page 9, paragraph 0049, lines 20-23, recite, "In Example 1, the variation value (column c) is determined using Formula 1-1, the estimated maintenance date (column (d) is determined using Formula 1-2, and the current value (column b) is determined using formula 1-3."

Formula 1-2, defines Forecast Day = Date + [(Min value of parameter – Current Value) / Variation]. The claim requires "the maintenance date being estimated by adding (a) a current date to (b) the difference divided by the variation value" and, based on Formula 1-2 the difference is given by "Min value of parameter – Current Value" which is not the same as the difference defined above as "Max value of parameter – Current Value".

Therefore, the specification does not sufficiently enable one having ordinary skill in the art for "obtaining a difference between a detected value of the parameter and a maintenance value of the parameter; determining whether the difference is less than or equal to a predefined value...estimating a maintenance data according to the

difference and a variation value...the maintenance date being estimated by adding (a) a current date to (b) the difference divided by the variation value."

Independent claims 12 and 20 are similarly rejected under 35 U.S.C. 112, first paragraph, because of their limitations for "obtaining a plurality of differences between a plurality of detected values of a plurality of parameters of the tool and a plurality of maintenance values of the parameters; determining whether each difference is less than or equal to a corresponding predefined value for each parameter...estimating a maintenance date according to the difference and a plurality of variation values for each parameter if the predetermined number of the difference are not less than or equal to their corresponding predefined values, the maintenance date being estimated by adding (a) a current date to (b) differences of the plurality of differences divided by the variation values of the plurality of variation values" and "a controller operatively connected to the database and configured to estimate a maintenance date for the tool according to a variation value and a difference between a detected value of the parameter and a maintenance value of the parameter, the maintenance date being estimated by adding (a) a current date to (b) the difference divided by the variation value; wherein the controller is configured to provide a recommendation that a maintenance procedure be performed on the tool when the difference is less than or equal to a predefined value", respectively.

Claims 2-11, 13-19, and 21-23 are rejected under 35 U.S.C. 112, first paragraph, because they incorporate the lack of enablement present in their respective parent claims.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 22 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 22 is considered to be vague and indefinite because it refers to "the maintenance schedule" while there is no previous mention of any "maintenance schedule". Therefore, it is unclear to one having ordinary skill in the art as to what "the maintenance schedule" refers.

Claim 23 is considered to be vague and indefinite because it refers to "a plurality of maintenance values of the parameters and a plurality of detected values of the parameters". Parent claim 20, however, only estimates a maintenance date for a tool with respect to one parameter and therefore it is unclear to one having ordinary skill in the art as to what "parameters" are being referred in claim 23.

Response to Arguments

11. Applicant's arguments with respect to claims 1-23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure:

U.S. Patent No 6,735,549 to Ridolfo teaches a predictive maintenance display system.

U.S. Patent No. 6,453,279 to Prasad et al. teaches a statistical trend generator for predictive instrument maintenance.

U.S. Patent No. 6,405,108 to Patel et al. teaches a process and system for developing predictive diagnostics algorithms in a machine.

U.S. Patent No. 6,266,597 to Eastman et al. teaches a method of maintaining components subject to fatigue failure.

U.S. Patent No. 5,608,845 to Ohtsuka et al. teaches a method for diagnosing a remaining lifetime, apparatus for diagnosing a remaining lifetime, method for displaying remaining lifetime data, display apparatus and expert system.

U.S. Patent No. 5,231,594 to Kniblehler et al. teaches a maintenance monitoring system.

JP Patent Application Publication No. 2001-1249964 to Akaeda teaches a periodical maintenance management system for a customer device.

13. Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jrw
April 3, 2006

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